

Coastal Science and Engineering Center CSEC

Ideas for involvement of TU Delft

Nov 4, 2016



**US Army Corps
of Engineers®**

TU Delft

Hydraulic Engineering

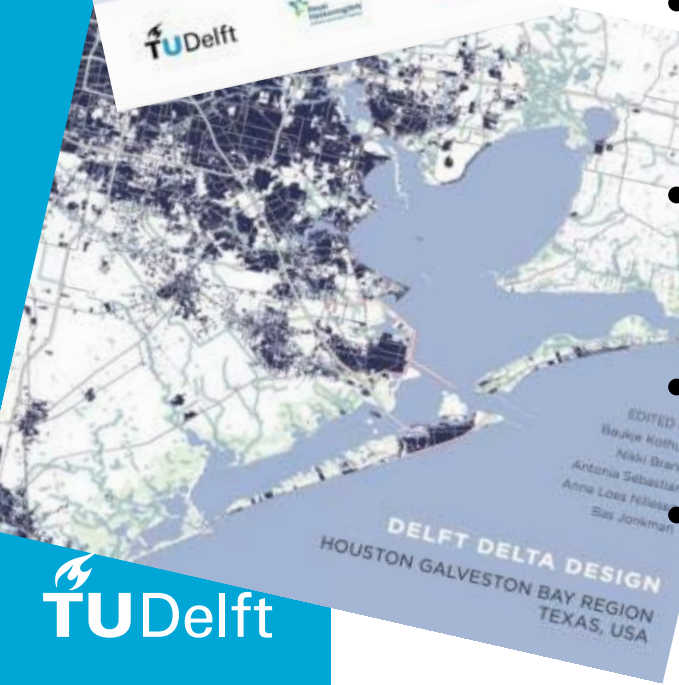
- Key areas: coastal management, flood risk reduction, hydraulic structures, ports
- Closely working other groups (geo, architecture, policy, ecology) to develop integral approach for coastal management and design
- > 100 Msc students per year (1/4 international)
- Focus on science – engineering – design, strong “application” orientation
- Working in tradition of Dutch delta works and initiating recent innovations e.g. sand engine
- MoA with Texas A&M Galveston since 2012



TU Delft - Texas involvement



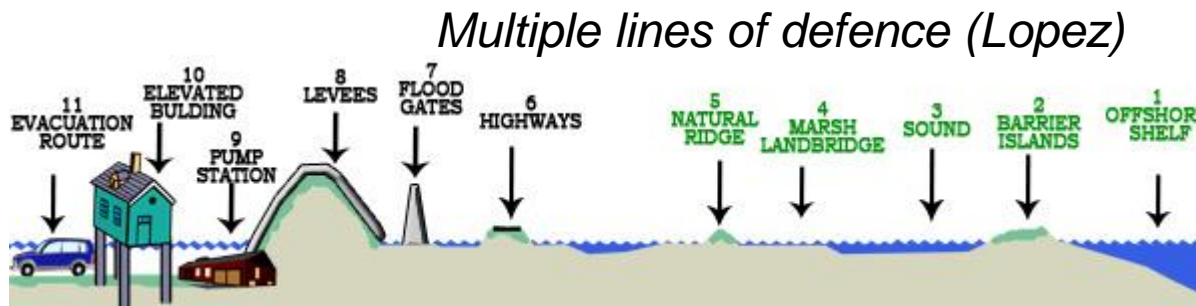
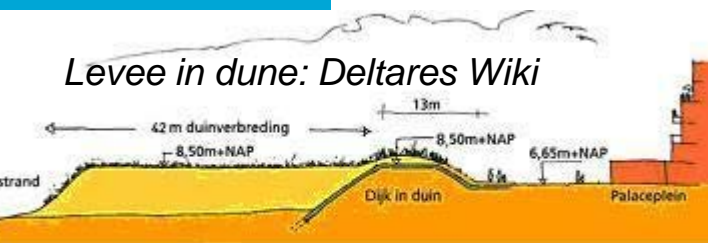
- Multiple exchange visits
- Delta Interventions studio (2014 / 2015)
- Student projects: 20 Msc thesis, 3 PhD; PDEng, Multidisciplinary project teams
- PhD exchange (Fulbright from Rice University)
- Since: 2016 NSF-PIRE 'Coastal Flood Risk Reduction Program' partnership – 5 TU Delft co-PI's
- 'Texas meets Texel' student workshop Building with Nature – 20 multidisc. NSF-PIRE & TUD students
- 2014 / 2015: involved in barrier and coastal levee explorations
- 2016: Multiple Lines of Defense – System optimization research project (MODOS)



Flood Risk Reduction Expertise & interests



- Storm surge barriers:
 - Design and parameters
 - Management and operation (With RWS)
- Hybrid structures (performance, design, evaluation)
- Flood risk and reliability evaluation:
 - Probabilistic design
 - Multiple lines of defence – systems optimization
- Multi-level planning, strategy formulation and evaluation
 - incl. delta-urbanism, emergency management and governance



Coastal Engineering Expertise & interests



Land reclamation Bahrain (UAE)



Maasvlakte, NL



Hondsbossche en Pettemer
Sea Defense



- Domain: shorelines, estuaries, coastal seas
- Range of solutions for engineering / design / CZM:
 - Soft: Beach (sand nourishment, landscaping)
 - Hybrid (levee in dune)
 - Hard (coastal structures)
- Physics based modelling of interscale sediment dynamics (Delft3D, XBeach, Aeolis)
- Innovative measurements (satellite, video, radar, lidar, laser, jetski, coastal observatories), data-driven modelling

Building with Nature Expertise & interests

- Design and implementation of marine infrastructure – with benefits for nature, society and economy
- Multi-disciplinary approach (engineering, ecology, governance)
- Strategic research programs linked to full-scale pilot cases (Sand Motor Delfland, natural foreshore Houtribdijk, mangrove shoreline Indonesia)
- Close links with USACE (Engineering with Nature) and USGS
- Education TUD: Course BwN (5 ects), MOOC (since 2016)



Key staff involved



Bas Jonkman, professor of hydraulic structures and flood risk



Stefan Aarninkhof, professor of coastal engineering



Baukje "Bee" Kothuis, researcher & liaison TAMUG - TU Delft



Sierd de Vries, assistant professor of coastal engineering



Jill Slinger, lecturer coastal engineering & associate professor of
technology, policy & management

General / other / closing remarks

- Mechanism / ideas:
 - >50 Msc's per year in the coastal and flood risk groups at TU Delft -> involve in projects?
 - Comparison studies: NL – TX
 - 'Sand Box'-tool student R&D
 - Field and monitoring pilots
 - (online) education for professionals
- Next steps:
 - Identify joint interests
 - Plan formulation
 - Joint workshop in 2017?
 - Look for ways to support action and exchange

